

## **Anionic Hair Styler**

### **FIELD OF THE INVENTION**

5       The present invention generally relates to an electric iron additionally generating anions for smoothening ladies hair.

### **BACKGROUND OF THE INVENTION**

10       Men and women use many kinds of appliances to care for their hair, such as hair dryers and various types of irons. All these instruments heat and damage the hair. Repeated exposure to heat and such stress makes the hair rough. To protect their hair, many women use additional hair protecting agents. The present invention is to provide an electric iron for hair  
15 straightening without damaging the hair.

### **DESCRIPTION OF THE PRIOR ARTS**

20       From U.S. Patent 1,455,696 to Wright to U.S. Patent Publication US 2003/0052115 to Leung, all the prior art related with electric irons for hair treatment has no parts for producing anions.

U. S. Patent 5,939,059 and 6,264,931 to Franklin, et al. illustrate a 2-in-1 conditioning shampoo includes an anionic surfactant and a cationic hair  
25 conditioning agent. U.S. Patent 5,714,446 Bartz, et al. discloses hair conditioning shampoo compositions comprising from about 5% to about 50%, by weight, of an anionic surfactant component. U.S. Patent 5,679,330 to Matsuo, et al. illustrates a shampoo composition containing an anionic

surfactant. U. S. Patent 5,456,863 and 5,358,667 to Bergman illustrates a conditioning shampoo composition containing an anionic cleansing surfactant. U. S. Patent 5,409,628 Heinz, et al. discloses a hair shampoo composition presenting improved hair-conditioning properties, comprising 5 of at least one anionic surfactant. U. S. Patent 5,077,041 to Yamashina, et al. discloses a shampoo composition that includes an anidoamine-type amphoteric surface-active agent. U. S. Patent 4,247,538 Barker illustrates aqueous compositions useful for shampooing, cleaning and conditioning hair and containing an amphoteric shampoo base, a cationic surfactant and an 10 anionic macro colloid polymer. U. S. Patent 4,001,394 to Fogel, et al. discloses a shampoo, crème rinse composition containing an anionic detergent.

As shown in the later part of the prior arts, the anion does a key role in conditioning hair. However, none of the prior art regarding hair irons 15 illustrates a method of producing and introducing anions to the hair while treating with electric hair irons as shown in the present invention.

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## **SUMMARY OF THE INVENTION**

It is the purpose of the present invention to provide an electric iron for straightening women's hair that is capable of producing anion. The electric iron has an electron generator embedded on one of the handle of pivotally connected handles. Electrons are generated from the inside of an AC/DC converter and transferred to the end of the cathode line, which is equipped with a number of thin carbon fiber filaments at the opposite end, that meets air and generates oxygen anions. Oxygen anions produced there come into contact with the hair and make the hair smooth and silky.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view of the anion generating electric hair straightening iron of the present invention.

FIG. 2 is an exploded inside plane view of the lower handle and the lower heating blade.

FIG. 3 is an exploded side view of the lower handle.

FIG. 4. is an exploded inside plane view of the upper handle and the upper heating blade.

FIG. 5 is the cross sectional view of the inside of the electron generator.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a perspective view of the anion-generating electric hair straightening iron (1) of the present invention. The iron (1) is comprised of two handles (2) pivotally connected by a hinge (3), which is installed close to one end (4) of the handles, and two heating blades (5) developed at the other ends of the handles (2). The handles (2) have limitations of opening by the shape of one end (4) of the handles (2). A spring (6) in the spring holder (7) keeps the handles open when not in use. An on/off switch (8) and a heating blade (5) temperature controller (9) are located on one end of the upper handle (2-U) and connected to 120/220V multi-power code (10). An electron generator (11) is embedded in the lower handle (2-L). A circuit checking light (23) through the window (12) at the side of the lower handle (2-L) indicates operation of the electron generator (11). Pluralities of holes (13) are developed along the side part of lower handle (2-L) below the lower heating blade (5-L).

FIG. 2 is an exploded inside plane view of the lower handle (2-L) and the lower heating blade (5-L). FIG. 3 is an exploded side view of the lower handle (2-L). The lower handle (2-L) is comprised of a plastic housing (14-L), a plastic handle cover (15-L), two Ni-chrome heating plates (16-L) surrounding a ceramic spacer (17-L), two composite insulators (18-L), an aluminum oxide heating plate cover (19-L), electron generator (11), cathode line (21), carbon fiber brush (22), and circuit checking light (23). One pair of 110/220Volt AC power lines (24-L) are connected to the two Ni-chrome heating plates (16-L). A ceramic spacer (17-L) is inserted between the two Ni-chrome heating plates (16-L). The two Ni-chrome heating plates (16-L)

are again covered with two composite insulators (18-L). The composite insulator (18-L)/ Ni-chrome heating plate (16-L)/ ceramic spacer (17-L)/ Ni-chrome heating plate (16-L)/ composite insulator (18-L)/ assembly is inserted to the groove (25-L) developed on the aluminum oxide heating plate cover (19-L). The groove (25-L) is engaged to the other groove (26-L) developed in the upper part of the plastic housing (14-L) of the lower handle (2-L).

Another pair of 110/220 Volt AC power lines (25) are connected to the circuit checking light (23). The light (23) is attached to the inside of the window (12) developed on one side of the plastic housing (14).

The electron generator (11) is connected to an electric circuit board (27) comprised of capacitance and resistances, which are embedded in the upper handle (2-U) (is shown in FIG.4). A cathode line (21) comes out from the electron generator (20). At the end of the cathode line (21), a bundle of carbon fiber brush (22) is connected by a rubber hold (28). The electron generator (20) is inserted to a holding groove (29) developed on the plastic handle cover (15-L).

FIG. 4. is an exploded inside plane view of the upper handle (2-U) and the upper heating blade (5-U). Another /composite insulator (18-U)/ Ni-chrome heating plate (16-U)/ ceramic spacer (17-U)/ Ni-chrome heating plate (16-U)/ composite insulator (18-U)/ assembly is inserted to the other groove (25-U) developed on another aluminum oxide heating plate cover (19-U). The cover (19-U) and the assembly are inserted on another groove (26-U) developed in the upper part of the plastic housing (14-U) of the upper handle (2-U).

110/220 Volt electric power source line (30) is connected to an electric circuit board (27). The two Ni-chrome heating plates (16-U) are

directly connected to the power source lines (30) without pass through the resistances, transistors and capacitances on the circuit board (27). One line (30-1) of the power source line (30) is connected directly to the electron generator (11) and the other line (30-2) is connected to the circuit board (27)  
5 to place the resistances, transistors and capacitances connects the two lines (30-1 and 30-2).

The electric circuit board (27) and lines are embedded in the lower part of the plastic housing (14-U) of the upper handle (2-U) and covered with the cover (15-U).

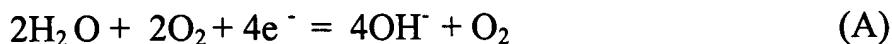
10 When the power is supplied to the hair iron (1) of the present invention by turning on the switch (8) placed on the upper handle (2-U), the power is supplied directly to the light (23). Power to the Ni-chrome heating plates (16-L and 16-U) is connected to the temperature controller (9) placed on the upper handle (2-U) and supplied to the Ni-chrome heating plates (16-L and  
15 16-U).

Fig. 5 is the cross sectional view of the inside of the electron generator (11). The electron generator is comprised of two electric coils (31-1 and 31-2) from the power lines (30-1 and 30-2). The coils (31-1 and 31-2) are wound around a metal rod (32) spaced by pluralities of non-conductive  
20 spacers (33). On end of the metal rod (32-e) there is small gap and locates a cathode plate (34). The cathode plate (34) is connected to the cathode line (21) and the carbon fiber bundle (22). The whole coils (31-1 and 31-2), metal rod (32), spacers (33), cathode plate (34), and cathode line (21) are covered with cement (35) and sealed with a tar layer (36) to make air free  
25 environment.

When the ac power is supplied to the lines (30-1) and (30-2), the electric circuit board (27) connected to line 30-2 and the coils (31-1 and 31-2) form

an electron generator (20). Free electrons (37) are generated from the coils (31-1 and 31-2) and guided to the cathode (34) by the magnetic field developed by the coils (31-1 and 31-2) and metal rod (32). The free electrons (37) pass through the cathode line (21) meets air at the tip of carbon fiber  
5 (22).

Here, one of the following electrochemical reactions occurs;



Reaction (A) is more probable in aqueous phase. Reaction (B) is more probable in air phase.

The anions produced by any the above reactions (A) and (B) get out of  
15 the straightening iron (1) through the pluralities of holes (13) and contact with the hair of a user. The most probable hypothetical reaction is (B) because the atmosphere surrounding the end of the carbon filter brush (22) is dry. The oxygen anion ( $\text{O}_2^-$ ) produced by the reaction (B) will be distributed to the hair of the user through the pluralities of holes (13) developed along  
20 the side part of lower handle (2-L) below the lower heating blade (5-L). It will react as the source of the anion for the surfactants reside in the hair of the user after shampooing (refer to U.S. Patents introduced in the PRIOR ARTS about the shampoos) or will make the environment of the hair more alkalic.

25 The idea of producing anion utilizing ac/dc converter and applying it to the electric hair treating instruments such as hair dryers, permanent irons, etc., is easily imaginable.